Prototype V1 learning goals & requirements

Cloud Prototyping Goals and Requirements

1. Learn to receive and store sensor data from the device
    1.1. The cloud system must provide a way to submit sensor data
2. Learn to design an effective database
    2.1. The database should uphold standard designing principles and practices, such as BCNF
3. Learn to send data as requested from the database to the app
    3.1. The system must have a way for the app to request data
    3.2. The system must be able to send the data to the app reliably
4. Learn how to host and run a simple remotely accessible cloud server
    4.1. Server should be accessible over internet
5. Learn to store passwords on the server side with some form of encryption
    5.1. The password must be stored securely in the database
    5.2. The service can authenticate connection according to entered username and password
6. Learn to make the cloud infrastructure fault tolerance (with backups and recovery methods)
    6.1. The service are resistant to failure and should still be useable after disasters

App Prototyping Goals and Requirements

1. Learn how to fetch data from backend
    1.1. The app should get data to display from backend
    1.2. The fetching should be done at a reasonable rate
2. Learn how to enable seeing the data
    2.1. The app should be accessible from the web
    2.2. The app should display the data fetched from backend
    2.3. The app should update the shown data as more data is fetched
    2.4. The display method should suit the data shown
3. Learn how to make intuitive app interface
    3.1. The app should be easy to use and intuitive
        3.1.1. As much information as possible in view at once
        3.1.2. The information amount should not be overwhelming
    3.2. The learning curve should not be too steep
4. Learn about authorization (login)
    4.1. The app should be (password) protected
        4.1.1. Passwords should be stored hashed
5. Learn about pairing an app with a specific device
    5.1. App should fetch data from specific device

Physical Prototyping Goals and Requirements

1. Learn how to design tool-less rigid interconnecting parts.
    1.1. The parts should fit tightly and be easy to put together
2. Learn about using a variety of materials to increase stiffness (e.g. aluminium tubes/profiles).
    2.1. The structure of the enclosure should not collapse on itself if there are no external forces acting on it.
3. Learn about working with acrylic/polycarbonate (or other transparent plastics).
4. Learn how to make robust electrical connections that can be safely connected and disconnected without tools.
    4.1. Connections made between modular parts should be stable and not cause any sparks when connecting and disconnecting.
5. Learn how to make the modular parts intuitive to connect.
    5.1. The user should not need a complex instruction manual to assemble the device.
6. Learn how to design enclosures and parts that revolve around the dimensions of the electrical components (e.g. the Raspberry Pi).

Embedded Prototyping Goals and Requirements

1. Learn how to connect soil sensor, temperature sensor, and light sensor to Raspberry Pi.
    1.1. Soil-, temperature-, and light sensor must be connected to the Raspberry Pi.
2. Learn how to get readings from the sensors.
    2.1. The Raspberry Pi must receive sensor readings on demand.
3. Learn how to display sensor data on a small display.
    3.1. A display must be connected to the Raspberry Pi.
    3.2. The display must show readings from the 3 sensors.
4. Learn how to connect Raspberry Pi to a cloud service.
    4.1. The Raspberry Pi must connect to a wireless router.
    4.2. The Raspberry Pi must have a basic connection to the cloud service.
5. Learn how to send data to the cloud service.
    5.1. The Raspberry Pi must send basic sensor data to the cloud service.
6. Learn the power requirements for the pump and lights and how to connect them to the raspberry Pi.
    6.1. The LED lights can be turened on.
7. Learn how to take pictures with the Raspberry Pi camera module.
    7.1. The Raspberry Pi must be able to take pictures and store them locally.
8. Learn how to brighten and dim the LED lights.